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ABSTRACT

Questions have been raised about what criteria to use in selecting, training, and hiring teachers, and when those measures should be taken--at the time of entrance to teacher preparation programs or at the end of training and at the time of certification. Another question concerns the demonstrated teaching competency of the teachers selected and prepared by institutions relying on rigorous admission and exit criteria. A final question emerges about the employment of student teachers who do demonstrate competence on tests in performance. This paper reports on a series of five studies conducted at a major university over a two-year period. Admission criteria, performance and employment of student teachers were examined in the light of scores on the National Teacher Examinations (NTE) for General Knowledge or for disicpline specialization in either the life sciences, physical sciences or social studies areas. Results show that the NTE tests do not contribute additional information about the student teachers that isn't already available through other measures, nor does NTE predict either teaching performance or employment of teachers. (JD)

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THE RELATIONSHIP OF NTE EXAMS TO TEACHER EDUCATION ADMISSION, PERFORMANCE, AND EMPLOYMENT

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THE RELATIONSHIP OF NTE EXAMS TO TEACHER EDUCATION ADMISSION, PERFORMANCE, AND EMPLOYMENT

ABSTRACT

Issues of teacher quality, supply and demand, and teacher education programs permeate the popular and research oriented literature. Critical attention has fostered programmatic changes in teacher education. This included increased admission criteria, more rigorous and comprehensive assessment of student teaching performance, and ongoing evaluation and assessment of critical elements of the teacher certification process.

From an historical perspective much of the conversation about educational achievement seems redundant. Many of the forces affecting educational outcomes today are similar to those experienced in the first half of this century. Indeed, many of the issues seem remarkably similar to those of the 20's and 30's, during which time the impetus for national teacher testing occurred. The national reports recently produced reflect concerns about competency in academics, competency in teaching and competency in basic skills. Again, there is impetus for national teacher testing programs.

Given the concern about the state of education in this country, many are asking questions about what criteria to use in selecting, training and hiring teachers. A second, related, question is when those measures should be taken - at the time of entrance to teacher preparation programs or at the conclusion of training and at the time of certification? A third question concerns the demonstrated teaching competency of the teachers selected by and prepared by those institutions relying on rigorous admission and exit criteria. A final question emerges about the employment of those student teachers who do demonstrate competence on tests and competence in performance.

This paper addresses these issues by reporting on a series of 5 studies conducted at a major university over a 2 year period. Admission criteria, performance and employment of student teachers were examined in light of scores on the National Teachers Examinations for General Knowledge or for discipline specialization in either the life sciences, physical sciences or social studies areas. Results show that the NTE tests do not contribute additional information about the population of student teachers that isn't already available through other measures, nor does NTE predict either teaching performance or employment of student teachers.

INTRODUCTION

The issues of teacher quality expressed by many of the recent national reports on excellence in education have led a number of universities and colleges to increase the admission requirements and/or the exit standards for teacher certification programs.

Emphasis has been placed on higher grade point averages and demonstrated academic ability on national standardized tests, among which are the Professional Knowledge, General Knowledge, and discipline specific Specialty Tests of the National Teachers Examination. A number of questions exist regarding the relationship of achievement on the various teachers examinations to the demonstrated competence of the teacher in performance of instruction and to the nature of subsequent employment of those individuals trained in such institutions.

This current focus on demonstration of teaching competency is not singular to this period of time. If one looks at the history of the National Teachers Examination, one finds that controversy over testing for certification purposes is long standing (Wilson, 1985). Parties on either side argue for or against standardized testing as a procedure for guaranteeing capable, competent teachers. During the 1920's and 1930's as the economy made gigantic swings from excess to depressed, the market supply and demand for teachers vacilated. During the 20's a shortage of teachers fostered a demand for a 'larger stock' which could be supplied by testing and granting of "emergency" licenses to individuals who had not completed a professional certification program. During the 30's the supply was large and the call for "emergency" licenses was unnecessary. However, the call for standardized testing did not cease. Indeed, it was argued the tests were necessary to weed out those of "limited mental ability," the teaching candidates who were seen as "narrower people" with "uninformed and incompetent minds."

This unfortunate perception of ineptitude of teachers has been revived by the public reporting of the numerous current national educational reform documents just at a time of change in the supply of teachers. The reports focus on 3 main areas of teaching competency: basic skills proficiency, subject matter competency and teaching performance (Roth, 1985; Nelson and Wood 1985) The argument for competency testing appears to be centered on when the individual should be "passed" as competent and how that should be determined. One camp argues that testing for competency in the academic discipline in which the teacher works should be done prior to admission to a teacher training program. The subsequent field experience for the student teacher would insure pedagogical skills. Others argue that testing should be a matter of licensing, comparable to the Bar Exam for attorneys, or the Medical Boards for physicians, and should include academic and professional knowledge competencies.

Examination of reports and research studies related to teacher testing suggest a number of underlying assumptions. Some reports suggest that schools, colleges, and departments of education are responsible for the poor preparation (of teacners) and that subject matter tests are essential to guarantee teachers who are knowledgeable in the subjects taught. This is based on an assumption that all subject matter courses within a teacher preparation program are 'watered down' for teachers (Roth, 1985). A further assumption is that academic performance of teacher education candidates is substantially

less than the general college population. Another assumption is that scores reflecting academic competence correspond to teaching competence. It is further assumed that academic competence in teachers is reflected in achevement by students in the K-12 classroom. (Wilson, 1985). A closer look at this notion suggests that selection criteria for teachers ought to be based on their relative achievement on content based exams, basic skills exams, and measurements of academic achievement.

The purpose of this paper is to further examine the question of competency testing as it relates to admission into a teacher certification program at a research university, and as it relates to the academic capabilities of those who meet the admission criteria. It further extends the question of academic or testing competence to its relationship to teaching performance and to the final question of academic and performance criteria as they relate to employment in teaching.

Over two years, we conducted five studies making use of the National Teachers Examination in assessing admission criteria and subject matter competency as well as the prediction of teaching performance and employment. The population for each study was the pool of teacher education students at a the Univerisity of Washington.

Admission Criteria

The initial study was a test of predictive validity of admission criteria used for the Teacher Education Program at the University of Washington. The study sought to determine the relationship of the National Teachers Examination for General Knowledge (NTE GK), to grade point averages (GPA) and a test of basic skills (California Achievement Test of Basic Skills (CAT) which are current measures used for admission.

The sample consisted of 131 student teachers who were accepted into a teacher education program during the fall and winter of 1984-85. Students were required to take the NTE General Knowledge test before starting the program. Scores were not used as admission criteria. Rather, admission to the teacher education program was determined by grade point average and demonstrated competence on the California Achievement Tests of Basic Skills (CAT). In recent years the College of Education has sought to improve the quality of its students by increasing the minimum grade point average requirement to be equal to or greater than the University wide undergraduate mean GPA. At the time of the study this minimum standard was 3.02. Students were also expected to achieve a score at the 80th percentile or better on the California Achievement Tests battery. Data on GPA and CAT-T were acquired at the time students applied for admission to the teacher certification program. Grade point average was computed on the 60 credits earned prior to admission. Scores were entered into the Teacher Education Research Center data base.

Descriptive statistics were computed for the NTE General Knowledge test, the CAT battery (including the Reading, Spelling, Listening, Mathematics subtests as well as the Total score) and GPA. The following table lists the high and low score range for the students, the mean score for the group and the standarad deviation for each variable. In addition, the table denotes the national mean and the University mean as a percentile ranking.

TABLE I

TABLE COMPARING UNIVERSITY STUDENTS' SCORES ON THE NTE, CAT-T, AND GPA WITH THE NATIONAL NORMS AND UNIVERSITY MEAN GPA

Variable	Low	High	Mean	S.D.	Nat'l Mean	Univ. %-tile Rank
NTE GK	632	687	670.6	9.8	656	82%
CAT R	56	70	66.6	3.0	46	95%
CAT S	11	20	17.4	2.3	12	88%
CAT L	39	63	56.6	3.9	45	85%
CAT M	48	85	76.0	8.0	53	83%
CAT T	192	237	216.9	11.6	155-6	93%
GPA	2.5	3.9	3.3	.3		3.02*

*Overall University Undergraduate Mean GPA

A regression analysis was computed for the NTE GK using GPA, each of the CAT subtests and the CAT Total score as possible predictors. The best predictor of the NTE GK score was the Total CAT score ($r = .677$; $p = .0001$). Grade Point Average was not a statistically significant predictor for the General Knowledge test. A test of correlation between GPA and CAT Total showed the correlation to be low ($r = .1223$; $p = .08$).

This study provided information about the general admission criteria being used at the University to admit student to the Teacher Education Program. On a comparative basis nationally the admission criteria being used to select candidates for the program seems to provide assurance of competency in general knowledge. The results suggest that NTE GK and CAT measure the same basic competencies, and either test will provide essentially comparable data for selection. The findings also suggest GPA measures a separate or different characteristic from that being measured by basic skills competency tests (i.e. NTE GK or CAT-T).

Academic Achievement

The study previously cited suggests that GPA and one or both kinds of basic skills scores or general knowledge measures may provide data for admission or recommendation for certification. The national reports also suggest competency in an academic discipline is desireable. The NTE Specialty exams are required by several states as a minimum competency exit exam for teacher certification and has been suggested as a reasonable exit requirement for any state or program.

The second study conducted on students in the university's teacher education program was smaller and focused on subject matter competence of secondary students. Two teaching areas, Social Studies and Science, are not defined as academic majors at this university. Rather, academic majors are more narrowly defined e.g. Political Science, History, Physics, etc. and are subsumed in the teacher education program under the broader category. National Teachers Exams in the Specialty Areas of Social Studies; Chemistry, Physics and General Sciences; and Biology and General Science were administered to 17 social studies students, 7 physical science majors and 17 life science majors, during the last quarter of their student teaching experience to determine whether students who majored in a narrowly defined academic field would have the broader field competency for teaching.

For this study narrow academic preparation was operationally defined as a ratio of credits in the major to total credits in the field. Total credits in the academic discipline were counted, as were the number of credits earned in corraborative courses. The resulting 'narrowness' scores were compared to the 'Narrowness Index' for that major. Grade point averages were tabulated. Means and standard deviations on the NTE exams for each major field were computed for the subjects. Scores were compared to the national norms for each NTE Specialty Area Tests. Additional statistics included correlations computed between NTE scores and GPA; NTE scores and percent of major (narrowness of preparation); and NTE scores and total field credits.

Findings from this study provide a profile of the final quarter student teacher in both social studies and science. Table II summarizes average scores on the NTE Specialty exams and the corresponding percentile rankings. Grade point averages for each major and composite averages for the corresponding teaching areas are included. For both NTE scores and GPAs, the high-low range of scores is shown.

TABLE 1.

MEAN NTE SCORES, PERCENTILE RANKINGS AND RANGE OF GPA FOR SOCIAL STUDIES AND SCIENCE MAJORS

MAJOR	N	MEAN NTE SCORES	%-ILE RANK*	NTE RANGE LOW - HIGH		GPA	GPA RANGE LOW - HIGH	
SOC ST	17	679	82	620	770	3.39	2.91	3.86
Hist		686	84			3.35		
Psych		686	83			3.50		
Econ		690	88			3.34		
PolSci		625	66			3.30		
BIO	17	737	87	650	810	3.29	2.69	3.70
Biol		740	87			3.30		
Earth Sc		728	87			3.27		
CHEM/PHY	7	684	85	620	740	3.13	2.83	3.55
Chem		666	82			3.01		
Physics		730	95			3.45		

* Ranks are based upon the 1984 NTE National Norms.

Table III is a set of correlation matrices for NTE Specialty Exam scores, GPA, academic credits earned in the major and the relative narrowness of the major within the broader discipline. The corresponding probabilities of occurrence are identified by asterisks.

TABLE III

CORRELATION MATRICES FOR NTE SCORES, GPA, NARROWNESS PERCENTAGE, AND TOTAL CREDITS FOR THE SOCIAL STUDIES AND SCIENCES

		NTE SCORE	GPA	NARROWNESS PERCENTAGE	TOTAL CREDIT
SOCIAL STUDIES					
	SCORE	1.00			
	GPA	.69**	1.00		
	NARROW	.30	.60**	1.00	
	TOTAL	-.38	-.51*	.63**	1.00
BIOLOGY AND GEN. SCIENCE					
	SCORE	1.00			
	GPA	.22	1.00		
	NARROW	-.10	-.17	1.00	
	TOTAL	.51*	-.03	-.44*	1.00
CHEMISTRY, PHYSICS AND GEN. SCIENCE					
	SCORE	1.00			
	GPA	.76**	1.00		
	NARROW	-.52	-.66*	1.00	
	TOTAL	.57	.63	-.55	1.00

* Indicates probability of less than .05
** Indicates probability of less than .01

The NTE Specialty Exam scores correlated significantly with GPA for both the Chemistry-Physics students and the Social Studies students, but not the Biology students. On the other hand, the NTE scores correlated significantly with the total number of credits taken by the Biology-Earth Science students, but was not significant for either the Chemistry-Physics students, or the Social Studies students. Such findings make interpretation difficult. The descriptive statistics suggest that GPA as an admission criteria assures the academic competence of the candidate, at least as demonstrated by achievement on the NTE Specialty Exams. However, the correlational analysis leaves doubt about making generalizations too broadly.

Teaching Performance

The two previous studies look at the admission criteria used for the Teacher Education Program, and compare them to NTE GK as an admission criteria and the NTE Specialty Exam as an exit competency. Neither study suggests that any one of the measures relate specifically to demonstrated competency in teaching. Indeed, they only represent single data points in an evaluation of an individual's competency for teaching.

However, other studies have looked at the predictive ability of professional competency tests or related criteria on performance measures. In one study (Dobry, Murphy, and Schmidt, 1985) GPA was found to be related to the NTE Professional Knowledge Exam, which in turn, was found to have no predictive validity for performance. Another study (Nelson and Wood, 1985) looking specifically at the issue of pedagogy, found that hours in methods course work and corresponding grade point averages were the single statistically significant indicator for subsequent success in teaching.

Still other studies (Dobry, Murphy, and Schmidt, 1985: Nelson and Wood, 1985) have focused on performance outcomes as predicted by specified admission criteria. The results have shown little relationship between successful performance of prospective teachers in the classroom and 1.) academic performance as measured by GPA, 2.) academic discipline identified by declared majors and corresponding hours of coursework, or 3.) basic skills test performance.

None of the studies cited investigated the predictive validity of the NTE Specialty Exams on scores achieved in a performance based student teaching evaluation instrument. The Specialty Exams test breadth and depth of knowledge in an academic discipline as it relates to the teaching profession.

The third study re-examined the science groups at the end of their final quarter of student teaching. The purpose of this study was to examine the predictive capability of NTE Specialty Tests, California Achievement Tests (CAT) and Grade Point Average (GPA) on teaching performance of student teachers as measured by a performance based assessment instrument. A total of 24 students were sampled in this study.

During their student teaching practicum, students were observed and evaluated using a lesson observation instrument. Scores were based on observed performance. At the end of the quarter university supervisors and the cooperating teacher together evaluated the student's performance on a Likert-type scale, for 11 performance-based evaluation items. The scores for the 11 items were added for a total evaluation score for the purposes of this study only.

Descriptive statistics were computed for students' GPA, CAT-T, NTE Specialty Test for their major and final evaluation scores.

Regression analysis was computed for GPA, CAT-T, and NTE, on final evaluation scores. Students involved in this study took the NTE Specialty Tests just prior to the end of their final quarter in the program. Scores were obtained from Educational Testing Service.

Table IV shows mean scores for GPA, CAT-T, and NTE Biology and General Science, and Chemistry, Physics and General Science Tests at 3.23, 220, and 737 and 678 respectively. These scores compare to admission criteria minimums of 3.03 for GPA and 200 for CAT-T. The NTE scores are not used for admission or certification, but compare to national scaled scores of 87% and 84% respectively. The summed evaluation score averaged 47 points out of a possible 55. The range of evaluation scores was 32.5 to 55.

TABLE IV

MEAN SCORES AND CRITERION LEVELS FOR GPA AND CAT-T SCORES, AND PERCENTILE RANK FOR NTE SCIENCE SPECIALTY EXAM SCORES

COMPETENCY MEASURE	MEAN	ADMISSION CRITERIA	PERCENTILE RANK
GPA	3.23	3.03	
CAT-T	220	200	
NTE/CHEM.	678		0.84
NTE/BIOL.	737		0.87

For the purposes of this study a decision was made to combine the percentile ranked scores for both the Biology and General Science Exam and the Chemistry, Physics and General Science Exam into a single measurement unit. This would provide an N of 24 for statistical analysis using a regression procedure. While the tests are different and scored on different populations, for purposes of this study we assumed percentile ranking on a national exam measuring achievement in a content specific area to be a meaningful unit of measurement for prediction.

Multiple regression was computed to determine predictive value of GPA, CAT-T scores, and the percentile rank achieved on a content specific national teaching exam (NTE Specialty Tests) on the dependent variable, a teaching performance score as measured by summed PBEI scores. Our hypothesis was that the NTE exams would be an effective predictor of student teaching success. Likewise, it was predicted that our admission criteria, GPA and CAT-T scores, would be effective predictors of student teaching achievement.

Table V summarizes the results of the multiple regression procedure. As can be seen in the table, none of the F scores were statistically significant. This suggests that neither GPA, CAT-T, nor the NTE Specialty Exams for Chemistry, Physics and General Science or Biology and General Science are effective predictors for student teaching performances. The findings might also suggest that sampling or measurement difficulties are contributing to the results of this study.

The table does provide other information of interest. The Simple R is a zero order correlation between the dependent variable and each independent variable. The Simple R for the NTE percentile ranks is a -0.28, with CAT-T and GPA being positive correlations of 0.10 and 0.04 respectively. The Multiple R (0.33) shows the strength of the relationship of all of the independent variables as predictors of performance. R Square reports the proportion of variance explained by all of the variables entered into the regression as 0.11. The multiple correlations and the residuals suggest that the variables used in the study have some import, but that other factors not identified may be better predictors of performance.

TABLE V

SUMMARY TABLE OF MULTIPLE REGRESSION OF STUDENT TEACHING PERFORMANCE SCORES ON PREDICTOR VARIABLES OF GRADE POINT AVERAGE, CALIFORNIA ACHIEVEMENT TEST TOTAL SCORES, AND PERCENTILE RANKS ON NATIONAL TEACHERS EXAMINATIONS-SCIENCE SPECIALTY TESTS

VARIABLES ENTERED	MULTIPLE R	R SQUARE	SIMPLE R	OVERALL F
Percentile Rank	0.28	0.07	-0.28	1.88 (p = .18)
CATT	0.31	0.10	0.11	1.19 (p = .32)
GPA	0.33	0.11	0.04	0.82 (p = .49)

A fourth study was conducted to assess the predictive ability of the NTE General Knowledge test on the teaching performance of the initial population studied. A regression analysis was done on NTE GK as a percentile rank score with PBEI Total scores, with the results showing an overall F of 1.86 and a statistical significance of .176. There was no significant correlation between the two measures and this suggests the NTE GK does not predict successful teaching performance.

Employment

The final study assessed the predictive ability of NTE GK scores, performance scores, California Achievement Tests scores, and Grade Point Average (GPA) on subsequent employment. For the final study, employment survey forms were sent to 65 of the original study population. Forty three surveys were returned. Data was obtained from 66% of the sample of students.

The proof of the pudding for any teacher education program is the successful employment of its graduates. Employment is affected by a number of factors including available positions, willingness of the candidate to move, and/or accept positions in geographically undesireable locations, and of course, the competency of the candidate.

In the final study, a discriminant function analysis was done on GPA, CAT-Total, NTE GK and Performance Scores from the PBEI to determine their efficacy as predictors for employment. Sixty five students were surveyed regarding employment following completion of the Teacher Education Program. The following table provides frequency data on employment status.

TABLE VI

FREQUENCIES AND GROUP MEANS FOR GPA, CAT-T, NTE GK, AND PBEI FOR SIX CATEGORIES OF EMPLOYMENT

	Frequency	%	GPA	CAT-T	NTE GK %-ile	PBEI
Teaching	20	31	3.32	217	76	52.3
Employed/Looking	2	3	3.36	228	90	51.3
Substitute	16	25	3.40	216	73	48.5
Employed/Not Looking	2	3	3.28	206	65	50.5
Not Applicable	3	5	3.46	216	80	50.3
No Return	22	34	3.36	211	66	50.3

The discriminant function analysis was computed using the Wilks lambda method for the 4 groups reporting employment status (groups 1 - 4). The assumptions underlying the discriminant function analysis provide that a set of predictor variables can differentiate between groups or categories. The Wilks lambda test provides values computed into F values for purposes of accepting or rejecting the null hypothesis. Variables are entered individually, with the selection rule being the minimum lambda score. This means the first variable entered accounts for the most variance.

The following table provides the results with each step entered, the corresponding F and the statistical significance of the results. The null hypothesis for this study is that no differences exist between the means of each criterion group for each of the predictor variables. The predictor variables are GPA, CATT, PBEI and NTE GK (reported as a percentile).

TABLE VII

DISCRIMINANT FUNCTION ANALYSIS OF PBEI, CAT-T, GPA, AND NTE GK IN PREDICTING EMPLOYMENT STATUS OF TEACHER EDUCATION PROGRAM GRADUATES

ACTION STEP ENTERED	VARIABLES IN	WILKS LAMBDA	EQUIV. F	D.F.	SIGNIFICANCE
1. PBEI	1	.873	1.75	3 & 36	.1738
2. CAT-T	2	.756	1.75	6 & 70	.1219
3. GPA	3	.693	1.49	9 & 83	.1631
4. NTE GK*					

* The F level or tolerance or VIN is insufficient for further comoutation.

Findings from this study provide no assurance that measures used to admit students to the teacher education program, nor scores achieved on teaching performance measures, nor achievement scores on a standardized national teachers examination can reliably predict full time teaching employment. Employment criteria remain elusive and unpredictable, at least in regard to typical measures taken of teacher candidates. Without a doubt, further investigation into employment patterns is warranted, particularly in that successful employment of graduates in one measure of achievement of any college or department of education.

SUMMARY AND CONCLUSIONS

In summary, the National Teachers Examination provided the national standard against which this university measured admission criteria and academic major requirements. It has been tested for predictive validity for both teaching performance and subsequent employment. The findings from this series of studies showed the NTE GK to provide similar data on admission as the CAT battery, making it redundant. The NTE Specialty Exams validated the academic caliber of the students in the program, but didn't predict teaching performance of the students and does not strongly suggest itself as a competency measure for certification. Finally, the NTE GK does not provide

predictive capability for teaching success nor full time teaching employment.

Some people have suggested NTE be used as an entry level exam comparable to the Bar or Medical Boards. This series of studies suggest that NTE is perhaps not the most effective tool for identifying the "brightest and the best." Its sensitivity for discrimination of quality at the upper end of the scale is inadequate. Its predictive value seems beset by conditions resulting in a ceiling effect. Where NTE does compare favorably with other criteria (eg. CAT scores) the other test may be an easier or less expensive test to administer.

This series of studies reveals a limitation in the use of the NTE GK and Specialty Tests with populations of greater than average academic ability and achievement. Further, the lack of a correlation between any of the tested measures (CAT, GPA, or NTE GK) and teaching performance suggests additional unidentified characteristics may more adequately define successful student teachers. The findings from these studies urge the profession to continue to search for ways to identify the "brightest and the best" and encourage them to select teaching careers. It also suggests further study in the hiring practices of school districts may be an appropriate, perhaps necessary, endeavor.

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